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THE LAWS OF HEREDITY. By G. Archdall Reid, M.B., F.R.S.E. With a Diagrammatic Representation by H. H. Turner, Savilian Professor of Astronomy, Oxford. London: Methuen & Co., 1910. Pp. xl, 548.

This volume is described as covering the whole field of heredity. It cannot be surprising if one finds inequalities in a work which deals with so comprehensive a subject from diverse points of view. The reader who does not mind taking trouble will be enlightened concerning almost every problem of heredity that is of supreme importance to the community. But he will have to take trouble, for the book contains little internal cohesion or arrangement, and the sentences are sometimes so long that their meaning is obscure.

The work seems to fall into three parts, which might with advantage have been separated. The first part is concerned with the general problems of heredity. Amongst these we may mention, as illustrative, the problem whether evolution is ever anything but adaptation; whether it is conceivable that the development of the individual can occur otherwise than by recapitulation, and therefore whether retrogression can ever be other than reversion; whether the main mass of retrogression is due directly to natural selection or also largely to retrogression occurring in complete absence of selection. To many of these problems the author gives original solutions, which, whether right or wrong, will be provocative of abundant discussion and criticism. Into the latter it is not possible for the reviewer to enter in any detail. Dr. Reid accepts the theory of natural selection in a form which is quite unique, and certainly there is much to be said for the view that he adopts. Speaking generally, however, he seems to attribute too much to natural selection and its rôle in the causation of progression and the origin of species. The author's premise that species have arisen through natural selection need not be granted. Natural selection can only act negatively, never positively. It can explain why certain imaginable types do *not* exist, but it can never explain the species of life that actually *do* exist. It can no more afford an adequate explanation of the latter than the neglect of a housemaid affords an adequate explanation of the existence of cobwebs. Indeed, there are several aspects of Darwinian criticism of which the author does not take sufficient account. He starts from the point at which Darwin stopped and combines with the latter's theory of evolution the following hypothesis, which he reaches by induction: that species tend to retrogress on cessation of selection, and that offspring recapitulate the main feature of parental development. From these he infers (1) "that retrogressive variations tend to predominate over progressive variations; (2) that, with rare exceptions, variations are spontaneous, and that spontaneous variations tend to occur all round the specific mean; (3) that, therefore, the germ plasm is highly insusceptible to change throughout the direct action of the environment; (4) that, apart from his own progressive variations, the development of the individual is an abbreviated and inaccurate recapitulation of the evolution of the race; and (5) that, therefore, every retrogressive variation is, in effect, a reversion."

The second part of the book, comprises Chapters XI to XXII. It is concerned with the evidence in favor of the conclusions arrived at in the earlier chapters, which is to be obtained from the study of human beings. The author does not make explicit his reasons for this reversion of the natural order of procedure. Facts which throw light upon two great problems of heredity are specially considered. The first of these problems is the causation of variations. From the study of microbic diseases and narcotics the author concludes that the great mass of variations are spontaneous. Other problems of heredity and evolution which arise in relation to disease and alcohol are treated in detail and with great lucidity. The conclusion concerning the offspring of alcoholics can hardly be taken as quite final, in spite of the fact that it is in harmony with the results of the recent researches of Miss Elderton and Professor Karl Pearson upon this subject. It does not recognize the probable truth of the statement that alcoholic habits chiefly attack our best stocks. If, as Dr. Reid says, alcoholism has no influence upon the germ plasm, we have yet to explain how it is that the offspring of these superior stocks do not show a very distinct superiority over the offspring of the sober, but weakling and inferior, stocks amongst which alcoholic habits have brought their parents down to live. The second great problem of heredity which is specially considered is that of the proportion which the 'innate' characters of any species bear to its 'acquirements.' This is treated in connection with the study of the influence of heredity on mind. Two views are held by opposing schools of biologists: those who hold that intellectual and moral characteristics are instincts, and therefore inherited, and to be improved by selective breeding; and those who hold that the innate mental characteristics are few in comparison with those which are acquired, and are therefore not transferable. The author's own view is that the intellectual characteristics of the adult human being have developed much more under the stimulus of use than under that of nutriment, and that therefore the adult mind is far more made than born. The general study of mind in Chapters XVII to XXII will probably be of interest to the general reader, but it has no real psychological value.

The third part of the book deals with the practical application of the principles of heredity to problems of great importance in human life. Amongst these it is sufficient to note, the methods of improving physical health and development, the prevention of disease, the reduction of alcoholism, the care of the feeble-minded and the insane, and the general problem of education. The importance of education lies in the fact that it very largely makes the individual, although it cannot be said to have any influence upon the biological evolution of the race. That is to say, the individual germ plasm is unaffected by any training or education which the parent may receive.

Finally, the book contains an appendix in which Professor Herbert Hall Turner represents diagrammatically many of the ideas connected with inheritance. This is a very new and distinctive feature of the work, which certainly adds to its lucidity, especially for those readers whose training has been mathematical.

There is one other criticism which we are disposed to offer, and that is the excess of repetition. The reader will be distracted by the innumerable and unnecessary discussions upon scientific method. Although he may not object to the chapter devoted to this subject, which would certainly have been better as an introduction, he will inevitably be oppressed by the perpetual recurrence of the topic throughout the whole work.

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